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SOLVAY

Air Quality Modeling Analysis

Introduction

An air quality modeling analysis is being performed to assess impacts associated with the expansion of the Solvay facility. The pollutants being evaluated include criteria pollutants (PM_{10}, CO, NO_x, SO_2) and several hazardous air pollutants (HAPs). Emissions are being modeled to determine compliance with the National Ambient Air Quality Standards (NAAQS), assess impacts with respect to HAPs criteria, and determine effects of acid deposition on regional water bodies. Visibility & Regional Haze

Methodology

All of the analyses are based on atmospheric dispersion modeled using the Industrial Source Complex Model - Version 3 (ISC3). ISC3 is selected for its ability to model multiple sources in simple and complex terrain.

ISC3 includes building downwash algorithms, where appropriate, is its calculations. The BEE-Line version of GEP-BPIP is used to determine the building downwash parameters for the over 60 sources in the model runs. Only point sources are subject to building downwash.

Emissions and stack parameters have been provided by Solvay.

All stacks and vents are modeled as point sources. This includes all of the facility's sources except the coal unloading (#8), coal storage (#9), and mine vent (MV). These three sources as modeled as volume sources. A volume source is used to accurately represent initial lateral and vertical dispersion of the emissions from the source.

For sources #8 and #9, the volume is defined by the dimensions of the building containing the source. The longer of the width and length is used to define the initial lateral extent of the volume since, for both buildings, this is the side oriented parallel to the nearest fenceline receptor.

The mine vent is modeled as a volume source to account for the large initial horizontal mixing from the horizontally oriented vent. Based on information received from Solvay, exhaust from the vent can be felt at ground level at a distance of up 250 feet. The initial lateral extent of the mine vent source is based on this distance. The vertical extent of the mine vent source is based on 16 feet, the height of the vent off the ground.

Receptor elevations were determined using digital terrain data provided by Bowman. Fenceline receptors are included in the modeling analysis.

Five years of meteorological data from Rock Springs (1987-1991) is used in this analysis.

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Criteria Pollutant NAAQS Analysis

Criteria pollutants from all sources were modeled using ISC3. Impacts are compared with the NAAQS and the deMinimis Monitoring Levels.

Upwind PM10 monitored data from the Solvay facility is added to the modeling results before comparing them with the NAAQS.

Although impacts above the significant impact levels (SILs) are shown for all pollutants, per conversations with the state, no background sources are modeled.

HAPs Analysis

HAPs emissions from sources #17, 48, 80, and the mine vent are modeled. Following procedures developed for OCI, results from this modeling are compared with the lowest and highest allowable ambient levels (AALs) from all existing state programs, as determined from a survey of EPA's NATICH bulletin board.

Initial modeling (with the mine vent being modeled as an area source) shows compliance with all of the high AALs, but not with some of the low AALs.

Based on these results and preliminary CO results, it has been decided that it would be more appropriate to model the mine vent as a volume source. This re-modeling is currently in progress.

Acid Deposition

NO_x and SO_2 emissions have the potential to convert to nitrates and sulfates and be deposited into sensitive lakes, ponds, and other water bodies. This can increase the acidity of these water bodies. Following the screening procedure described in the Interagency Workgroup on Air Quality Models (IWAQM) that is used in the TG modeling analysis acid deposition in several area lakes is being assessed.

The list of five lakes provided by Solvay is, with the exception of Black Joe's, different from the list of three lakes included in the TG analysis.

This analysis is currently in progress. Acid Neutralization Capacity (ANC) data is still required for the lakes that were not part of the TG analysis.

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